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EXAMINATION OF THE SKILL AREAS OF GIFTED CHILDREN USING WISC-R INTELLIGENCE SCALE SCORES

Ahmet Bildiren[i]
Dr., Assistant Professor,
Adnan Menderes University,
Special Education Department

Abstract:
In this study, it was examined whether the WISC-R test scores of gifted children differ according to their area of special ability or not. The sample group of the study was selected from 5 different cities and was comprised of a total of 237 gifted children with 48,9 % girls (n=116) and 51,1 % boys (n=121). The class level of the children varies between 4th and 11th grades. One-way analysis of variance (ANOVA) was used to analyze whether there are statistically significant differences between the ability areas of gifted children or not according to their WISC-R intelligence scale scores. In case of a difference, post-hoc tests were carried out for determining the groups with the difference. The accepted level of significance was 0,05. Study results put forth that the intelligence scores of gifted children varied according to their individual ability areas of performance.

Keywords: gifted children, WISC-R, area of ability

1. Introduction

Many approaches have been put forth until today regarding the skill areas (Binet & Simon, 1905; Gagne, 2003; Gardner, 2003; Sternberg, 2003; Renzullli, 1984; Stenberg & Zhang, 1998; Tannenbaum, 2003; Taylor, 1973; Terman, 1926). Even though opinions differ, majority has agreed that the potential may be diagnosed in some children and that the skill may be examined in different categories when this potential develops towards certain characteristics. Various theorists have focused on the genetic components of the gift and intelligence, whereas others have separated gift from talent

[i] Correspondence: email abildiren@adu.edu.tr

using factors of potential, luck and environment. Another group emphasized multiple intelligence. The definition and concepts of gift from the first years have been seen to be equivalent with high IQ levels. Psychometry experts such as Alfred Binet and Lewis Terman and psychologists were the first to emphasize that intelligence has genetic components. Binet (1905) and Terman (1926) developed a general test of intelligence applied for diagnosing gifted children. Intelligence tests were revised following these years and used frequently for diagnosing gifts. The opinions of these theorists regarding superiority are generally intelligence test focused. However, some theorists have argued recently that intelligence cannot be expressed in a single way and that superiority should include multi-dimensional concepts (Gagne, 2003; Gardner, 2003; Renzulli, 1984; Sternberg, 2003; Stenberg and Zhang, 1998, Tannenbaum, 2003; Taylor, 1973).

Renzulli developed the Three Ring Model in the field of superior ability and put forth this model with an educational perspective (Renzulli, 2005). In this model, factors of personality and environment interact with three property sets: Above average ability, Task commitment and Creativity. Especially Above average ability makes up 15-20% of the performance or performance potential. Task Commitment is a form of motivation. Whereas creativity emphasizes the creative successes of the individual. In this model, Renzulli (2005) has emphasized that a single ring or a set do not mean anything by themselves and that all three should be together for superiority.

Whereas Abraham Tannenbaum focused the definition of superiority on children with potential to display performances and create ideas in areas encompassing the moral, physical, social, emotional or aesthetic lives of people (Tannenbaum, 2003, p. 45). Tannenbaum (2003) suggests the "Star Model" for diagnosing children. The Star Model is comprised of five interactive factors with contribution to the superior behavior: a) superior general intellect, b) distinctive special aptitude, c) non-intellective traits, d) a challenging and facilitative environment, e) luck. These five factors interact in different ways to form different categories; however all should be present for giftedness. When these factors are combined, it means that the child has a potential to be a gifted adult in the future.

Gagne (2003) also focused on the aspect that gifted children can be understood from their behavior and he has also taken an interest in the potential of children but by separating the terms of gifted and talented. The difference between these two terms makes up the center of his definition of giftedness. In Differentiated Model of Giftedness and Talent, Gagne (2003) defines giftedness as having an orientation and endowed talent allowing him/her to enter in 10% among his/her peers. Moreover, Gagne (2003) classified the giftedness term in four areas as creativity, intellectuality, social effect and sensory motor. Talents have been defined in seven areas as art,

business, leisure, social actions, sports, technology and academic. According to Gagne (2003), three catalysers comprised of luck, environment and internal factors play an important role in the transformation of talent to skill. A developmental process is required for the transformation of talent to skill.

Robert Sternberg, an expert in the field of the gifted and creator of the Triarchic Theory of Intelligence along with Howard Gardner, the creator of the Theory of Multiple Intelligences have also made significant contributions to the multidimensional appearance of intelligence that has been put forth in recent years (Colangelo & Davis, 2003). Sternberg considered intelligence in a sociocultural context and put forth that personal standards are effective in the formation of one's talents (Sternberg, 2003). On the other hand, Gardner's (2003) Theory of Multiple Intelligences emphasized the importance of skills in multiple intelligence areas thus challenging the scholastic education systems based on traditional IQ tests. Gardner classified intelligence into nine categories as logical-mathematical, musical, spatial, kinesthetic, interpersonal, naturalist, intrapersonal and existential. Each of these intelligence types are autonomous and operate independently, however in some cases these intelligence types operate together thus creating unique individual profiles with strong and weak points. According to Gardner, a student may be considered as gifted when one or more of these intelligence areas are considered.

The opinions on giftedness detailed above can be classified in two basic categories: measurement of general skills using IQ tests and multiple opinions of giftedness related with each other. In the multidimensional category, Stenberg and Zhang (1998) emphasized productivity, Tannenbaum (2003) emphasized potential and distinguishing gift, Gagne (2003) emphasized the difference between talent and skill and the luck factor, Renzulli (2005) emphasized motivation and creativity, Gardner (2003) emphasized the diversity of intellectual skills and intelligence whereas Taylor (1973) emphasized decision making and foresight skills. Despite all differences, opinions with single and multiple dimensions diversified the diagnosis applications as single and multiple.

These developments in giftedness approaches have started to affect educational approaches as well as applications. Education programs are being applied according to different approaches in different countries. Science and Art Centers have been established by the Ministry of Education in Turkey for providing special education to gifted children. Students are nominated by their classroom teachers at state and private schools for entrance to the Science and Art Centers. The nominated students are first included in a group intelligence test after which they are taken in to WISC-R for individual examination. Students that are diagnosed as gifted according to the WISC-R test results (130 and above) are included first in an adaptation program followed by a

support education, a program for the realization of individual talents, a program for the development of gifts and finally a project program education. These programs include courses on science and technology, mathematics, Turkish, social sciences, visual arts, music, foreign language, information technologies, technology and design. Following the application of the adaptation program, support education program and the program for the realization of individual talents, the individual performance areas of each gifted child (science, social sciences and art) are determined in a teacher council meeting after which the children receive education special to gifted children in their own pre-determined areas (MEB Science and Art Centers Directive, 2016). Thus, intelligence tests are carried out for accepting students in the Science and Art Centers after which an educational evaluation based on education program and teacher observations is carried out for determining the areas of giftedness.

When the aforementioned giftedness approaches are considered, the diagnosis stage at the Science and Art Centers is carried out in the first group according to intelligence tests. However, the individual areas of giftedness of gifted children are determined according to the second understanding. Because thanks to the special education support provided, the observation of potential performance in the education environment as put forth by Tannenbaum (2003), the differentiation between skill and talent as in the approach by Gagne (2003) and the provision of the required luck environment related with social sciences and art, required motivation for the area of interest in which the child may perform best as put forth by Renzulli (2005) and introduction to different areas of intelligence as stated by Gardner (2003) are all accomplished.

As can be seen, the evaluation of giftedness has taken on a multidimensional structure both in Turkey and in the world. The inclusion by Renzulli of motivation and creativity along with above average talent, the inclusion by Tannenbaum and Gagne of distinguishing factors such as special talent and application, the opinions put forth by Stenberg and Zhang for the evaluation of a rare talent and productivity along with IQ have brought about new discussions. So, how can we analyze general talent (IQ) and a distinguishing and potential special talent (gift) (science, art, sports etc.)? How can children diagnosed as gifted according to the first approach perform according to the second approach? The objective of this study was to analyze the IQ levels and distinguishing special talents of gifted children that may contribute to this discussion. For this purpose, answers will be sought for the question of whether the IQ score averages of gifted children differ according to their areas of special talent or not.

2. Method

The study was carried out with a relational scanning model of comparison type. The relational scanning model which is a type of scanning models is one that aims to determine the existence and/or degree with which two or more variables change. Groups were formed among at least two different variables according to the independent variable after which it is examined whether there are any differences among the groups with regard to the dependent variable or not (Gall, Gall, & Borg, 1999).

2.1 Participants

The sample group of the study was selected from the Science and Art Centers which is the only official institution that provides education to gifted children in Turkey. The participants were selected from the Science and Art Centers in the cities of İstanbul, Burdur, Elazığ, Kütahya, Van by way of random assignment. Afterwards, interviews were carried out with the administrators of the selected Science and Art Centers, the numbers of students for whom the individual talent areas have been determined were taken and the study group was formed. Thus, the study group was comprised of a total of 237 gifted children with 48,9 % girls (n=116) and 51,1 % boys (n=121). The classroom level of the children varied between 4^{th} grade and 11^{th} grade.

2.2 Instrumentation

Wechsler Intelligence Scale for Children-Revised (WISC-R): WISC-R, that is the form revised in 1974 of the Wechsler Intelligence Scale for Children developed by Wechsler in 1949 is comprised of two sections as verbal and performance with 6 sub-tests in each section. The standardization of WISC-R on Turkish children was carried out by Savaşır and Şahin (1995) for a sample group of 1639 between the ages of 6-16. The split-half reliability of the test was determined as 0.97 for the verbal section and as 0.93 for the performance section and as 0.97 for the total score. The values of correlation between the sub-tests varied between 0.51 and 0.86 (Savaşır and Şahin, 1995).

Teacher Observations: Following the 40 hour adaptation program, 216 hour support education program and 432 hours of program for the realization of individual talents applied at the Science and Art Center in accordance with the related directives, the areas of performance for each gifted student are determined during a teacher council meeting after which the students receive special education in these areas (MEB Science and Art Centers Directive, 2016). The teachers record the performance levels of gifted children during the adaptation, support and realization of individual talents programs and the areas of individual performance are determined as science, social

sciences or art following the completion of the programs. The talent areas (Science, Social Sciences and Art) determined for the gifted children by the teachers following the observations was taken into consideration in the study.

2.3 Data collection and analysis

The WISC-R results of gifted children and the talent areas determined according to teacher observations were acquired from the Science and Art Centers. One-way analysis of variance (ANOVA) was used to determine whether there were statistically significant differences between the WISC-R intelligence scale scores of students according to different talent areas. Post-hoc tests were carried out for determining the groups with the differences when a difference was determined. The level of statistical significance for the acquired statistics was accepted as 0,05 and the findings were interpreted in accordance with the objectives of the study.

2.4. Procedure

Since the individual talent areas are determined following the program for the realization of individual talents, students who have completed this period were determined as the target group.

First of all, the Science and Art Centers in the cities of İstanbul, Burdur, Elazığ, Kütahya, Van were contacted and the WISC-R test results of the children in the study group were acquired. Afterwards, the areas of students determined according to teacher observation following the adaptation, support and program for the realization of individual talents were recorded.

3. Findings

This section of the study includes the findings acquired as a result of the statistical analyses carried out on the acquired data. The average values and standard deviations of the WISC-R intelligence scale performance scores for students according to areas of individual talent have been given in Table 1.

Table 1: Descriptive Statistics of WISC-R intelligence scale performance scores of students according to individual areas of talent

Performance IQ	N	X (IQ)	Sd
Science	165	136,19	8,28
Art	44	130,31	8,10
Social Sciences	28	131,53	8,71
Total	237	134,55	8,63

As can be understood from Table 1, it is observed that the WISC-R intelligence scale performance score averages of students selected to the science area are the highest when the WISC-R intelligence scale performance scores are examined according to individual talent area variable (X=136,19), that the WISC-R intelligence scale performance score averages of students selected to the social sciences area are second (X=134,55) whereas the WISC-R intelligence scale performance score averages of students selected to the art area are ranked last (X=131,53).

Results of the one way variance analysis carried out for determining whether there is a statistically significant difference between the WISC-R performance score averages of students for whom the individual talent areas have been determined are given in Table 2.

Table 2: Anove test results of the WISC-R intelligence scale performance scores of students according to individual talent area variable

Source of Variance	Sum of Squares	sd	Mean Square	F	p
Between Groups	1488,28	2	744,144	10,8	,000
Within Groups	16122,30	234	68,89		
Total	17610,59	236			

A statistically significant difference was determined between the groups with regard to the Anove results carried out for determining whether the WISC-R intelligence scale performance scores differ with regard to individual talent areas or not (F(2,234)=10,8, p<0,05). It was determined as a result of the LSD test carried out for determining which groups differ among each other that there was a statistically significant difference between the WISC-R performance score averages of students selected to the science area and those selected to the social and art areas.

The average and standard deviations of WISC-R intelligence scale verbal scores according to individual areas of talent have been given in Table 3.

Table 3: Descriptive Statistics of WISC-R intelligence scale verbal scores according to individual areas of talent

Verbal IQ	N	X (IQ)	Sd
Science	165	136,10	7,50
Art	44	130,70	6,17
Social Sciences	28	135,50	8,07
Total	237	135,02	7,60

As can be understood from Table 3, it can be observed upon an examination of the WISC-R intelligence scale score verbal scores according to individual talent area

variable that the WISC-R intelligence scale verbal score averages of students selected to the science area are ranked highest (X=136,10), that the WISC-R intelligence scale verbal score averages of students selected to social sciences areas are ranked second (X=135,50) and that the WISC-R intelligence scale verbal score averages of students selected to the art area are ranked last (X=130,70).

Results of the one way variance analysis carried out for determining whether there is a statistically significant difference between the WISC-R verbal score averages of students for whom the individual talent areas have been determined are given in Table 4.

Table 4: Anova test results for the WISC-R intelligence scale verbal score averages of students according to individual talent area variable

Source of variance	Sum of Squares	sd	Mean Square	F	P
Between Groups	1019,38	2	509,69	9,43	,000
Within Groups	12647,40	234	54,04		
Total	13666,79	236			

A statistically significant difference was determined between the groups with regard to the Anova results carried out for determining whether the WISC-R intelligence scale verbal scores differ with regard to individual talent areas or not ($F(2,234)=9,43$, $p<0,05$). It was determined as a result of the LSD test carried out for determining which groups differ among each other that there was a statistically significant difference between the WISC-R verbal score averages of students selected to the science area and those selected to the social and art areas. Similarly, a statistically significant difference was determined between the WISC-R verbal score averages of students selected to the social sciences and art areas.

The averages and standard deviations for the WISC-R intelligence scale total scores of students according to individual talent areas have been given in Table 5.

Table 5: Descriptive Statistics of WISC-R intelligence scale total scores of students according to individual talent areas

Verbal IQ	N	X (IQ)	Sd
Science	165	139,95	6,22
Art	44	133,47	5,16
Social Sciences	28	137,07	6,05
Total	237	138,41	6,51

As can be understood from Table 5, it can be observed upon examining the WISC-R intelligence scale total scores according to the individual talent area variable that the

WISC-R intelligence scale total score averages of students selected to the science area are ranked first (X=139,95), that the WISC-R intelligence scale total score averages of students selected to the social sciences area are ranked second (X=137,07) and that the WISC-R intelligence scale total score averages of students in the art area are ranked last (X=133,47).

Results of the one way variance analysis carried out for determining whether there is a statistically significant difference between the WISC-R total score averages of students for whom the individual talent areas have been determined are given in Table 6.

Table 6: Anova test results for the WISC-R intelligence scale total score averages of students according to individual talent area variable

Source of variance	Sum of Squares	sd	Mean Square	F	p
Between Groups	1515,93	2	757,97	20,87	,000
Within Groups	8497,53	234	36,31		
Total	10013,4	236			

A statistically significant difference was determined between the groups with regard to the Anova results carried out for determining whether the WISC-R intelligence scale total scores differ with regard to individual talent areas or not ($F(2,234)=20,87$, $p<0,05$). It was determined as a result of the LSD test carried out for determining which groups differ among each other that there was a statistically significant difference between the WISC-R total score averages of students selected to the science area and those selected to the social and art areas. Similarly, a statistically significant difference was determined between the WISC-R total score averages of students selected to the social sciences and art areas.

4. Conclusion, Discussion and Suggestions

In this study, the objective was to analyze the relationship between the potential performance in certain areas taken into consideration in the traditional gifted approach (IQ) and today's approaches. Study results put forth that the intelligence scores of gifted children differ according to their individual talent areas they perform in. This result leads us to think as such: Can students gifted in science, social sciences and art be diagnosed according to their high performance in these areas without being subject to any intelligence test? Or can they be diagnosed as gifted only according to the results of intelligence tests? Regarding these discussions, Van Tassel-Baska (2002) summarizes giftedness as such; if the intelligence includes solving problems at higher stages,

expertise in a certain area as well as the capacities of planning, observation and evaluation reflecting the work done by an individual; giftedness may be defined as an attribute of individuals who put forth greater performance levels in these skills in comparison with their peers. In other words, giftedness according to Van Tassel-Baska (2002) can be defined as advanced development in all intelligence areas or a specific area or an extraordinary power of organization for acquiring the desired result. Therefore, it can be possible that both options are actualized.

It can be stated that the answer to these questions are related with the giftedness approaches mentioned in the beginning. Because it is observed that intellectual skills are at the focus in both approaches. Binet (1905) and Terman (1926) handle general intelligence in a single dimension thus evaluating intellectual potential within a numerical value. Renzulli (2005), Tannenbaum (2003), Gagne (2003), Sternberg (2003) and Gardner (2003) put forth task commitment, environment, luck, distinguishing talent and intelligence areas but also emphasized intellectual skill for putting forth the potential performance. Therefore, it is not possible to consider giftedness apart from intelligence tests or not observing performance and creativity due to the fact that there is no definition of intelligence agreed upon by everyone since the 1800's and since there are new developments every day in the field of intelligence. At this point, it can be stated that handling both approaches together when evaluating gifted children will be more beneficial. Another data that supports this finding is that no student diagnosed as gifted according to the intelligence test was unsuccessful following the education program. The individual talent area of each child was determined.

Another striking finding was that the IQ scores of gifted children in the study group were ranked in decreasing order as science, social sciences and art. All students evaluated as gifted in the areas of science, social sciences and art were diagnosed as gifted according to WISC-R test. However, the intelligence test does not put forth the talent areas of children individually. It was decided as a result of the education program and teacher observations that the children were gifted in these areas. It can be stated according to the study results that there is a relationship between the IQ scores of children in the beginning and their potential areas of talent. Children with high IQ in the study group were evaluated as gifted in the area of science following the education program. However, only IQ and talent area were taken into consideration in the study. The study is limited with these two variables. There may be many factors affecting this (family, school, teacher, environment, etc.). In addition, it may be necessary to take into consideration the approach by Tannenbaum (2003) and Gagne (2003). This performance may have been observed because the children received special education support and an environment with stimulants in these areas and therefore luck. It is not certain whether their potential in these areas will be revealed or not if they are not given this

chance, however it has also been put forth that the revealing of talents is also related with the education environment provided (Maker, 1986; Maker & Schiever, 2005; Neihart, Reis, Robinson, & Moon).

Pfeiffer (2003) carried out a study in the field of giftedness with 64 authorities as a result of which it was determined that 60 out of 64 (94 %) experts listed the number one anxiety as "*lack of specialization in conceptualizing or defining talent and talents*". It has been put forth that a consistent definition of being gifted does not express potential or real production and that it causes confusion as to whether creativity or multiple intelligence are components of giftedness or not (Pfeiffer, 2003). Hence, the evaluation of giftedness according to these two approaches may lead us to results that are more consistent. For example, giftedness can be determined in five areas as is the case in the Giftedness Evaluation Scale (GES-2). These are intellectual talent, creativity, specific academic talent, leadership talent, performance and visual art skills and motivation (Smith, 2001).

Maker (1996) defined a gifted individual as having more than one norm focused on development and process rather than a constant intelligence test score. Accepting the definition of giftedness and the assumption of the supporting theories, he has emphasized the necessity of creating encompassing definition processes or in other words, the importance of designing various and effective processes and screening procedures for meeting the new concepts in giftedness.

Subotnik, Olszewski-Kubilius and Worrell suggested another approach for giftedness in 2012 in which giftedness focuses on performance at a higher section of the distribution in a specific talent. In addition, they defined three development stages. The potential talent that is the key to giftedness at the beginning is varied, but in later stages, it becomes the measure of giftedness. And finally, the label of giftedness is given with a fully developed performance in the talent area (Subotnik, Olszewski-Kubilius, & Worrell, 2012). An objective evaluation is expected in order to put forth the potential talent emphasized in the first stage. The use of intelligence tests during this stage may reveal this potential. The intersection of talent with success and the display of a full performance in the talent area during the second and third stages may be accomplished by providing the luck environment mentioned by Tannenbaum (2003) and Gagne (2003) as well as by improving the personal standards put forth by Sternberg (2003).

When the study results are taken into consideration in general, it is suggested to take into consideration the single dimension intelligence evaluations together with multiple-dimension evaluations. There is a need for an objective measurement for determining the potential and the observation of the process for displaying the potential in performance.

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